CASE WESTERN RESERVE UNIVERSITY
Case School of Engineering
Department of Electrical Engineering and Computer Science
ENGR 210. Introduction to Circuits and Instruments (4)
Spring 2005 Course Information (DRAFT VERSION)
http://vorlon.cwru.edu/~flm/engr210s05/index.html

Summary Description:
Modeling and circuit analysis of analog and digital circuits. Fundamental concepts in circuit analysis: voltage and current sources, Kirchhoff's Laws, Thevenin and Norton equivalent circuits, inductors capacitors, and transformers. Modeling sensors and amplifiers and measuring DC device characteristics. Characterization and measurement of time dependent waveforms. Transient behavior of circuits. Frequency dependent behavior of devices and amplifiers, frequency measurements. AC power and power measurements. Noise in real electronic systems. Electronic devices as switches. Digital logic circuits. Introduction to computer interfaces. Analog/digital systems for measurement and control.
Prerequisite: MATH 122. Co-requisite: PHYS 122.

NOTE:
1. The above is the official catalog description. The course will not cover the following topics: "AC power and power measurements. Noise in real electronic systems. Electronic devices as switches. Digital logic circuits. Introduction to computer interfaces. Analog/digital systems for measurement and control."
2. PHYS 122 is officially a co-requisite; however, the course will use PHYS material in only 1-2 lectures throughout the semester. Many students have successfully taken the course without having taken PHYS 122.
3. We will definitely use MATH 122 (integrals and derivatives, first order differential equations) material in the course.

Required Textbook: The Analysis and Design of Linear Circuits, 4th Ed., R. Thomas and A. Rosa, Wiley, 2004,ISBN 0-471-27213-2.
Lecture Schedule: MWF from 9:30 - 10:20 am in Strosacker Auditorium.
Instructor: Prof. Frank Merat, Glennan 518, x4572 (flm)
Teaching Assistants: tbd
TA Office Hours: tbd

LAST SPRING'S COURSE WEB PAGE MAY BE FOUND AT
http://vorlon.cwru.edu/~flm/engr210s04/home.html

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Basis of Grades

*Homework (**25 %**)*: Homework assignments will be posted on Wednesday mornings and collected on the following Wednesday during lecture. Students may work together on homework assignments, but each student is required to turn in his/her own work. Lowest two hw assignments will be dropped.
*Quizzes (**25 %**)*: Quizzes will be given in lectures on Friday mornings, and are based on the homework collected on Wednesday. Quizzes are closed book, and students must work alone. Calculators are generally not required. If used, they must be cleared of all programs and/or data before the quiz. Lowest two quizzes will be dropped.
*Laboratory (**25 %**)*: The laboratory for ENGR 210 is located in Glennan 308. Labs will be done in groups of two. *Students must attend regular lab sessions*, but labs may be completed during open lab hours. Lab reports, one per group, must be completed in a one-week period and turned in to the lab instructor during the regularly schedule lab period. The laboratory requires key card access and workstation accounts, which will be provided based on the class roster. Lowest two labs will be dropped.
THERE IS NO MID-TERM EXAM.
*Final Exam (**25 %**)*: The final exam will be given on May 4th, from 8:30-11:30 am. The exam is closed book, students must work alone, and calculators must be cleared of all programs and/or data before the exam.

Late Policy and Missed Assignments

Assignments are due in lecture/laboratory on the specified date. No late assignments will be accepted because of the liberal policy of dropping the two lowest homework, quiz and lab assignments. As per University policy, the Final Exam is absolutely required.

CWRU Student Ethics Policy

http://studentaffairs.case.edu/ai/policy.html
Violations of the Student Ethics Policy will be dealt with by failure in the assignment in question, failure in the course, or referral to the academic integrity board as per university policy.

All forms of academic dishonesty including cheating, plagiarism, misrepresentation, and obstruction are violations of academic integrity standards. Cheating includes copying from another's work, falsifying problem solutions or laboratory reports, or using unauthorized sources, notes or computer programs. Plagiarism includes the presentation, without proper attribution, of another's words or ideas from printed or electronic sources. It is also plagiarism to submit, without the instructor's consent, an assignment in one class previously submitted in another. Misrepresentation includes forgery of official academic documents, the presentation of altered or falsified documents or testimony to a university office or official, taking an exam for another student, or lying about personal circumstances to postpone tests or assignments. Obstruction occurs when a student engages in unreasonable conduct that interferes with another's ability to conduct scholarly activity. Destroying a student's computer file, stealing a student's notebook, and stealing a book on reserve in the library are examples of obstruction.

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Spring 2005 DRAFT Agenda and Assignment Dates

Notes:
1. Labs are posted on MON mornings and reports are collected the following week, at scheduled lab times.
2. HW is posted and collected on WED mornings (in lecture), and solutions are posted on WED afternoons.
3. Quizzes are given on FRI mornings (in lecture), and solutions are posted on FRI afternoons.
4. Reading is from The Analysis and Design of Linear Circuits, 4th Ed., Thomas and Rosa, Wiley, 2004.

Date	Class	Due	Agenda	Reading	Lab
1/10	1		Course Outline and Information	1.1	
1/12	2		Electrical units, engineering notation	1.1-1.3	*intro*
1/14	3		passive sign convention; Ohm's Law	1.3-2.1	
1/17			Martin Luther King Day		
1/19	4	HW1	switches; v and I sources"	2.2	**L1**
1/21	5	Q1	KCL; KVL; element constraints	2.2-2.3	Ohm's Law
1/24	6		series/parallel	2.3	**L2**
1/26	7	HW2	equivalent R; source transforms	2.4	Computer-based
1/28	8	Q2	voltage and current dividers	2.5	Instruments
1/31	9		fuses; circuit reduction	2.5-2.6	**L3**
2/2	10	HW3	node voltage techniques	3.1	LabVIEW and
2/4	11	Q3	Cramer's method; supernodes	3.1	DMMs
2/7	12		mesh current techniques	3.2	**L4**
2/9	13	HW4	linear circuits; proportionality	3.3	Function Generator
2/11	14	Q4	turning sources OFF; superposition	3.3	and Oscilloscope
2/14	15		Thevenin and Norton equivalent circuits	3.4	**L5**
2/16	16	HW5	maximum power transfer	3.5	KCL and
2/18	17	Q5	interface circuits	3.6	Superposition
2/21	18		dependent sources	4.1-4.2	**L6**
2/23	19	HW6	Thevenin and Norton of active circuits	4.2	Thevenin Equivalent
2/25	20	Q6	basic OP AMP amplifiers	4.4	Circuits
2/28	21		summing/subtracting amplifiers	4.5	**L7**
3/2	22	HW7	voltage follower; multi OP AMP circuits	4.5	Intro to Operational
3/4	23	Q7	comparators	4.7	Amplifier
3/7			Spring Break		
3/9			"		*none*
3/11			"		
3/14	24		Instrumentation systems; transducers	4.6	**L8**
3/16	25	HW8	unit impulse, step & ramp; exponentials	5.1-5.3	Comparator and
3/18	26		sinusoidal waveforms; rms & average power	5.4-5.6	Schmitt Trigger
3/21	27	Q8	No lecture (Quiz only)		**L9**
3/23	28	HW9	Capacitors and Inductors, i-v characteristics	6.1-6.2	Exponential
3/25	29	Q9	Integrators and differentiators	6.3	Waveforms
3/28	30		Series/parallel L/C, steady-state characteristics	6.4	L10
3/30	31	HW10	Forced sinusoidal response, phasors	7.1,7.2, 7.4,8.1	555 Timer
4/1	32	Q10	Euler identity; phasor manipulation	8.2	
4/4	33		Phasor current/voltage; impedance	8.2	L11
4/6	34	HW11	Circuit analysis with phasors	8.3-8.4	Passive RC
4/8	35	Q11	Frequency Response; Bode diagrams	12.1	Filters
4/11	36		Frequency response examples	12.2	L12
4/13	37	HW12	More frequency response examples	12.2	Active RC Filters
4/15	38	Q12	Bandpass and notch filters	12.3	
4/18	39		Step response; zero-input response	7.1,7.2	
4/20	40		State variables and differential equations	7.2	none
4/22	41		Time constants; initial/final value theorem	7.2	
4/25	42		Responses other than state variables	7.2	
4/27,28			Reading Days		
5/3			**Final**	8:30 - 11:30 am	

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Lecture Schedule: MWF from 9:30 - 10:20 am in Strosacker Aud.

Recitations (TENTATIVE SCHEDULE AND ROOM ASSIGNMENTS – ATTENDANCE IS NOT REQUIRED):
HW Recitation: Tuesday from 6:30 - 8:00 pm (White 411)
Quiz Recitation: Thursday from 6:30 - 8:00 pm (White 411)
Mini-Recitations: Tuesday from 1:30-2:30 (), Thursday from 3:00-4:00 ()

Lab Schedule	Lab Assistants
M 0330-0530	
M 0700-0900	
T 0245-0445	
T 0700-0900	
W 0330-0530	
W 0700-0900	

Course Web Page:http://vorlon.cwru.edu/~flm/engr210s05/index.html

Instructor: Prof. Frank L. Merat (responsible for lecture and overall course)
Office: Glennan 518
Voice: 216-368-4572
e-mail: flm@case.edu (Please use ENGR 210 in your subject)
Web: http://vorlon.cwru.edu/~flm/flm/home.html
Instructor Office Hours:

Lab Assistants:

Mark Zurcher	maz4@case.edu	

Teaching Assistants:
